

the old blotting paper after removal from the instrument.

It appears probable, therefore, that dead leaves were the chief source of the mold cells found in the air.

As a further test, on October 29, a disk was cut from a leaf of suitable dimensions to fit in the jet dust counter; this was sterilized by boiling; a record was taken on it by drawing 1,000 c.c. of air through at 9 a. m. and the disk of leaf placed under a glass in a drop of boiled water in a dark place.

A similar test was made on October 30 but the result of the experiment was negative. This, of course, may be due to the absence of spores in the air when the records were taken, and as a matter of fact records taken at the same time and examined microscopically did not show any spores present. It appears, however, fairly certain that the origin of the mold cells is as indicated, that is, from the dying leaves in the autumn, the conditions being very suitable.

#### THE DUST FALL OF MARCH 29, 1924: A PRELIMINARY NOTE

551.510.4 (775)

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This dust fall was detected at Madison, Wis., on the afternoon of March 29, 1924, by the author, some of whose studies, in collaboration with Dr. A. N. Winchell, have appeared in this REVIEW<sup>1</sup> and elsewhere.<sup>2</sup>

So generous have been the responses to our requests for cooperation that we have been provided with more samples of dust for analysis, and more reports showing the distribution of the dust than we have had for any previous dust fall.

Sixteen Weather Bureau stations in Nebraska, Iowa, Minnesota, Illinois, Missouri, Indiana, and Michigan, among 26 to which telegrams were sent from Washington by Supervising Forecaster E. H. Bowie, reported finding dust in the rain or snow. Mr. A. M. Hamrick, at Davenport, Iowa, secured the repetition of the request by radiophone from broadcasting station "WOC" and obtained 30 positive replies and 8 samples of dust from listeners in Iowa, Illinois, Missouri, and Wisconsin. A similar request sent out from "WHA" at Madison was interfered with by static and brought only a few replies. Postal-card inquiries addressed to directors of climatological sections in all States east of the Rocky Mountains brought reports of dust-raising winds in Texas, Oklahoma, Kansas, and Arkansas, of thick haze in Kentucky and Tennessee and of dust falls in the same list of States as that given above. No dust falls were observed east of Michigan and Indiana nor south of Tennessee. The most copious samples were taken in the upper Mississippi Valley.

The mechanism by which the dust was raised, transported, and deposited can be most easily understood by reference to the weather maps for March 28 and 29, 1924, and to the diagrams of storm structure due to Shaw<sup>3</sup> and Bjerknes.<sup>4</sup> The dust was blown up from the ground by the "sirocco" that formed the southern sector of the storm and carried northeastward against and up over the flank of the cold "northeaster" that hugged the ground north of the "steering line." Rain and snow produced by mechanical cooling in the ascent of the warm air washed down the dust, bringing it to earth in the "rain stripe" that characterizes the cold "northeaster" of every cyclone.

At Des Moines, Iowa, Springfield and Peoria, Ill., the dust was washed down in rain. North of a line through

The following test was made, which points directly to this source:

A number of dead leaves taken from the trees in the neighborhood of Cheam were placed in a tin box on the bottom of which a wet cloth was placed, and above the cloth a microscopic slide, the leaves being placed above this. After a couple of days the slide was removed, the leaves having been agitated slightly, and on examination under the microscope it was found to be covered by cells identical in appearance, dimensions and shape with those referred to as having been obtained from the air. (Figs. 9-11, Pl. III.)

The presence of these mold cells in the air in large numbers during the fall of the leaves may have some pathological significance, but what it is the author is unable to suggest at present. As a rule mold cells are nonpathogenic but it appears possible that they may have some effect which has not previously been realized.

Davenport and Chicago the precipitation was in the form of snow. The percentage of dust diminished with distance northward until it became so scanty at Duluth as to be found with difficulty.

It is proposed to procure thorough and exact chemical, mechanical, and microscopical analyses of the dust in the laboratories of the University of Wisconsin. A grant of \$200 has been requested from the research fund of the University of Wisconsin to defray necessary expenses in making analyses.

The most important things that it is proposed to study are (1) data that will be useful in interpreting the loess deposits of the glacial period, (2) the enrichment of the soils of the upper Mississippi Valley by dust blown from the more alkaline soils of the Southwest, and (3) the bacterial fauna accompanying the dust.

Information on the third of these points has already been supplied by Dr. J. G. Dickson of the department of plant pathology of the University of Wisconsin, who has germinated spores of various rusts and fungi from material that he collected on the afternoon of March 29, 1924, while the dust was still falling. He found the spores in the dust to be in a state that will not be reached by local spores until late in May, i. e., nearly two months farther advanced.

Previous analyses of dust falls have indicated that the present rate of deposit of dust from the atmosphere is much slower than must have prevailed in the glacial period. The samples from the present storm will not advance this information greatly for the reason that only those taken at Madison, Wis., and Windsor, Wis., a near-by village, were collected from measured areas of snow. If future dust falls deposit dust at the same rate, it will indicate that storms of the same type as that of March 29, 1924, were much more frequent in the glacial period than at present. This seems to be a reasonable deduction, since according to Bjerknes they tend to follow the "polar front" which is necessarily associated with the margin of the polar cap of snow, because the snow surface and the air above it are much colder than the air over bare ground. In the glacial period when this margin remained in these latitudes instead of retreating far to the northward as at present, it seems probable that "Colorado" storms were more frequent, and that dust was more continuously deposited. For these reasons it also seems probable that the loess was deposited in glacial rather than in interglacial epochs, as some geologists have suggested.

<sup>1</sup> Dust falls of March, 1918. *MO. WEATHER REV.*, 46: 502.

<sup>2</sup> Same, *American Journal of Science*, 46: 599.

<sup>3</sup> Forecasting Weather, Washington, 1911, fig. 96, p. 212.

<sup>4</sup> Structure of the Atmosphere when Rain Is Falling. *Q. J. Roy. Met. Soc.* 46: 128, and also *MO. WEATHER REV.*, 48: 401, July, 1920.